

NAVY PROGRAMS

USMC H-1 Upgrades

This program combines upgrades of two USMC H-1 aircraft: the AH-1W Cobra attack helicopter and the UH-1N light utility helicopter, to be upgraded to the AH-1Z and the UH-1Y respectively. The common elements of the two will be twin engines, drive trains, a new four-bladed rotor, tail sections, and integrated digital cockpits. In addition, the AH-1Z attack helicopter will gain an upgraded targeting system, and both will have upgraded navigation systems. The upgrade will extend the lives of the two H-1 models well into the 21st century.

TEST & EVALUATION ACTIVITY

DOT&E approved the Test and Evaluation Master Plan which calls for the T&E program to be conducted in two phases: integrated contractor/government developmental testing and operational testing. Both the AH-1Z and the UH-1Y will undergo OT&E and LFT&E.

Planning and execution of an Early Operational Assessment (OT-IIA) was the major test activity during FY03. OT-IIA was conducted at Naval Air Station Patuxent River, Maryland, from February 12 to March 27, 2003, and included 36.5 flight hours (22 sorties) and 11 missions in two H-1 Upgrade aircraft flown by operational test pilots. OT-IIA supported a low-rate initial production decision for three AH-1Z and six UH-1Y aircraft.

At the completion of OT-IIA, operational testers continued to monitor developmental testing and provide Marine maintainers assistance with aircraft maintenance and validate maintenance documents and procedures. Next year, operational testers will conduct another operational assessment that will provide data to support a second low-rate initial production decision. OT&E for both aircraft will be conducted prior to the full-rate production decision in FY06.

DOT&E designated the H-1 Upgrades Program as a covered system for LFT&E in June 1996. The LFT&E strategy covering both aircraft was approved by DOT&E in July 1996 and was included in the program's Test and Evaluation Master Plan approved for Milestone II in November 1996. Fifteen of the 18 component-level ballistic test series have been completed. FY03 tests include static tests of the main rotor yoke, the pitch change adapter, and the swashplate. These tests also involved post-hit fatigue tests on the standard test fixtures used to qualify these parts for flight. Planning has begun for the full-up system-level ballistic tests scheduled for 2QFY05. A battle damage repair team is expected to participate in the live fire testing to ensure that the aircraft system maintenance procedures take into account the possible nature of battle damage.

TEST & EVALUATION ASSESSMENT

The OT-IIA confirmed known issues with the aircraft design (identified in earlier developmental testing) and clarified the operational implications of these developmental issues early in the development phase. The Program Manager is taking advantage of early learning to develop and implement corrections on the aircraft.

Because the aircraft are under development, aircraft maturity imposed limitations on the degree of operational realism that could be achieved during OT-IIA. Major test limitations included software immaturity, a restricted flight envelope, contractor maintenance, and an absence of key-ground support equipment and diagnostic aids. Preliminary indications are that all Key Performance Parameters will be met if the program's plans to mitigate observed deficiencies are successful.



Both aircraft are projected to be substantially more survivable and crashworthy if hit by threat weapons. Vulnerable area estimates predict the vulnerable area of the new aircraft will be roughly half (AH-1Z) to two-thirds (UH-1Y) that of the in-service aircraft.

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The AH-1Z attack helicopter demonstrated a doubling in payload and a 20 percent increase in range and endurance over the AH-1W aircraft. The digital cockpit enhanced pilot situational awareness and reduced workload in some areas. However, poor targeting performance of the newly installed Targeting Sight System (TSS) degraded mission effectiveness and increased pilot workload. Problems with TSS stability, focusing, target loss during field-of-view changes, and anomalous TSS behavior must be resolved before this aircraft can be considered operationally effective.

The UH-1Y utility helicopter demonstrated a significant increase in payload, range, speed, and situational awareness over the legacy UH-1N utility aircraft. Assuming internal fuel cell problems can be corrected, the UH-1Y may be able to achieve the required mission radius of 110 nautical miles. The design of the aircraft increases the possibility of tail strikes (mitigated by the redesign of the tail boom stinger), infrared signature, and hover limitations. Excessive noise levels in the UH-1Y cabin degraded mission performance and elevated cabin temperatures might change mission effectiveness in hot weather. Collectively, these problems, if uncorrected, will limit the effectiveness of the UH-1Y across the full range of utility helicopter missions.

Both aircraft are projected to be substantially more survivable and crashworthy if hit by threat weapons. Vulnerable area estimates predict the vulnerable area of the new aircraft will be roughly half (AH-1Z) to two-thirds (UH-1Y) that of the in-service AH-1W and UH-1N aircraft. To date, testing has demonstrated that the components of the AH-1Z and the UH-1Y will retain or exceed the degree of damage tolerance found in their predecessors. The test results have been used to make several design changes that improve survivability.